TO MARGARET (COND. INFO.)

UNITED STATES
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FOREST SERVICE

NORTHEASTERN AREA

Defoliation by Gypsy Moth
on West Point Military
Reservation in 1985

Detection Report

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ABSTRACT

Two surveys, an aerial "sketch-map" reconnaisance and a 1:32,500 scale photographic survey, were conducted to detect 1985 gypsy moth defoliation on the West Point Military Reservation, Highland Falls, NY.

The sketch-map survey, which covered the entire reservation, detected 500 acres of defoliation, (300 acres light, 200 heavy), an underestimate. The survey was conducted too early in the insects' feeding stage.

The photographic survey, which covered the 6500 acre area that was treated with the biological insecticide Bt, revealed that 1380 acres had been defoliated (190 acres lightly, 880 moderately and 310 heavily). The photography allowed a comparison of sprayed and unsprayed areas, and showed the spraying greatly reduced the extent and severity of defoliation.

INTRODUCTION

Extensive and severe defoliation of the trees by gypsy moth (Lymantria dispar(L.)) first occurred on the West Point Military Reservation, Highland Falls, New York, in 1981. The insect population collapsed in 1982, but in 1984 high numbers of egg masses were found in Harriman State Park, immediately south of the Reservation.

An egg mass survey conducted in Fall 1984 showed gypsy moth defoliation to be expected in the western two-thirds of the 16,000 acre Reservation was 2,000 acres of light (30 percent or less of foliage removed), 2,300-2,600 acres of moderate (31-60 percent), and 3,700-4,200 acres of heavy to severe (>60 percent) defoliation. Subsequently, 6,500 acres were treated in June 1985 with the biological insecticide Dipel 4L, a formulation of Bacillus thuringiensis (Bt). The insecticide was applied to different portions of the area in two ways -- diluted in water and neat.

Two surveys, an aerial reconnaissance of the entire Reservation, and a photographic survey of the treated portion, were undertaken in Summer 1985 to detect what defoliation might have occurred.

METHODS

The aerial reconnaissance, during which defoliated areas were sketched on a topographic map of the reservation, was flown June 25, 1985. The aircraft used was a Cessna 172 equipped with a Loran C receiver for navigation and flown at 1,000 ft above the terrain. A single observer mapped and classified (light, moderate, and heavy as defined above).

The same Cessna 172, which has a camera port in the fuselage, was used for the photographic survey. The camera was a motorized Hasselblad equipped with a 70 mm magazine, a 50 mm lens w/yellow filter, and an intervalometer (exposure timer). The 70 mm film, Kodak Aerographic Color Infrared (Type 2443), in a Hasselblad yields transparencies 2-1/4" x 2-1/4" (57 x 57 mm). The scale, 1:33,500, was chosen to provide coverage for the entire area on the single magazine available. To obtain stereoscopic coverage, flight lines were plotted on a map so as to provide sidelap of 20 percent and the exposures were timed to provide a forward overlap of 60 percent. All exposures were made with the shutter set at 1/500 of a second and the diaphragm at f5.6.

To assure coverage of the 6,500 acre area, 42 photographs were required. The necessary inclusion of some non-treated and off-Reservation areas brought the total coverage up to about 12,000 acres.

To help compare the results of the two treatments, larger scale (1:7,000) photographs were obtained at 9 points within the treated area.

The photographs were interpreted (for degree of defoliation) and the defoliation classified as for the aerial reconnaissance. The interpretation was checked on the ground September 30-October 2, 1985. Estimates of defoliation made from the ground were placed in 10 percent categories (e.g. 21-30 percent).

RESULTS AND DISCUSSION

The aerial reconnaissance indicated about 500 acres defoliated (300 lightly, 0 acres moderately, and 200 acres heavily). However, the reconnaissance was apparently conducted too early--before the larvae had finished feeding. The same observer (George Saufley) later conducted the photographic survey, and noticed more defoliation than he had seen earlier. The defoliation found in areas not photographed was plotted on the map.

The 1:33,500 scale photography was successful. The images were sharp, no clouds or cloud shadows obscured the foliage, and coverage was complete. The interpretation indicated that about 1,380 acres had been defoliated on the treated area (see map). Of this, 190 acres were in the light category, 880 acres in the moderate, and 310 acres in the heavy.

The estimates of defoliation from ground check fell within the categories indicated by the photo interpretation in 10 of the 15 areas checked. In 4 of the 5 cases not falling within the categories, the ground estimates were adjacent to the category boundaries, e.g. 50-60 percent when the interpreter classified the area "heavy". In only one case did the two estimates differ greatly -- the ground estimate was 10-20 percent; the photo interpretation, "heavy". In a few areas, defoliation was found from the ground that was not apparent on the photographs or to the aerial observer.

The 1:33,500 scale photographs provided a means of comparing the area treated with untreated areas north and south of the Reservation. Defoliation in the latter areas was plotted on the map, along with the defoliation on the Reservation. The State park south of the Reservation was particularly heavily defoliated. The map provides graphic evidence that, though some defoliation occurred in the treated area, the defoliation would have been much more extensive and severe had the suppression project not been undertaken.

Of the 9 triplets (3 photographs) of 1:7,000 scale, only one was successful. Stereoscopic coverage was not obtained on the others, apparently because the speed of the aircraft was greater than intended. No comparison of the treatments was possible.

RECOMMENDATIONS

A single defoliation, even a severe one, usually does not kill a deciduous tree. However, it may, and for the next 2-3 years, Post personnel should inspect those areas in which defoliation was heavy, with an eye toward salvage cutting if necessary.

Treatment with Bt usually only prevents defoliation in the year it is applied. It does not exterminate the gypsy moth. Therefore, another egg mass survey will be needed in Fall 1985.